8-18-1960

Test 754: International T-4 (Gasoline)

Tractor Museum
University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA TRACTOR TEST 754 - INTERNATIONAL T-4 GASOLINE

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean and Acting Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cooling med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
32.54	2000	2.645	0.507	12.30	180	71	75	28.892
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
28.53	2064	2.391	0.523	11.93	175	70	75	.....
0.00	2182	0.895	....	....	146	72	76	.....
14.74	2132	1.751	0.741	8.42	160	67	77	.....
32.55	2001	2.646	0.507	12.30	177	73	76	.....
7.48	2162	1.279	1.067	5.85	157	74	79	.....
21.67	2088	2.088	0.601	10.38	172	75	80	.....
Av 17.50	**2105**	**1.841**	**0.656**	**9.51**	**164**	**72**	**77**	**28.882**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—2nd Gear											
26.99	4559	2.22	2005	2.20	2.538	0.587	10.63	180	78	83	28.865
75% of Pull at Maximum Power—Ten Hours—2nd Gear											
21.13	3453	2.29	2059	1.49	2.163	0.638	9.77	183	80	90	28.874
50% of Pull at Maximum Power—Two Hours—2nd Gear											
14.56	2305	2.37	2108	0.80	1.874	0.803	7.77	175	81	89	28.850
MAXIMUM POWER WITH BALLAST											
26.08	6947	1.41	2000	4.45	1st Gear.....			188	72	82	28.920
27.10	4577	2.22	2000	1.78	2nd Gear.....			183	72	75	28.940
26.00	2760	3.53	2000	1.51	3rd Gear.....			177	74	78	28.930
25.27	2004	4.73	1997	1.35	4th Gear.....			177	77	85	28.930
23.25	1352	6.45	1995	0.89	5th Gear.....			180	77	85	28.930
18.90	7409	0.96	2069	6.36	1st Gear Torque-Amp			186	76	85	28.920
25.95	6680	1.46	1999	4.11	2nd Gear Torque-Amp			188	74	81	28.920
26.43	4169	2.38	1998	1.63	3rd Gear Torque-Amp			196	74	78	28.940
26.30	3093	3.19	1999	1.47	4th Gear Torque-Amp			179	76	82	28.930
24.83	2139	4.35	2000	1.38	5th Gear Torque-Amp			190	77	85	28.930

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—2nd Gear						
Pounds pull	4600	4750	4950	5150	5150	4900
Horsepower	27.1	25.3	23.8	20.6	17.9	14.4
Miles per hour	2.2	2.0	1.8	1.5	1.3	1.1

Department of Agricultural Engineering
Dates of Test: August 18 to September 3, 1960
Manufacturer: INTERNATIONAL HARVESTER COMPANY OF CANADA LTD., HAMILTON, ONTARIO, CANADA
Manufacturer's Power Rating: Not Rated

FUEL, OIL and Time Fuel regular gasoline **Octane** No Motor 84 **Research** 92 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.7492 **Weight per gallon** 6.237 lb **Oil SAE** 10W-30 **API service classification** MS, DM **To motor** 1.456 gal **Drained from motor** 0.934 gal **Transmission Lubricant** IH Hy Tran **Final drive lubricant** SAE 90 **Type** gear lube **Total time motor was operated** 51 hours.

ENGINE Make International Harvester gasoline **Type** 4 cylinder vertical **Serial No** 84722 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** 3⅛" x 4" **Compression ratio** 7.3 to 1 **Displacement** 122.7 cu in **Carburetor size** ⅞" **Ignition system** battery **Cranking system** 6 volt battery **Lubrication** pressure **Air cleaner** oil washed wire screen **Oil filter** replaceable treated paper element **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type tracklayer **Serial No** 2329ADT **Tread width** 48" **Wheel base** 68" **Drawbar height** 13" **Measured length of track** 17½ ft **Cleats** integral with shoes **Cleats per track** 35 **Size of cleats** 12" x 2" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.55" Vertical distance above roadway 18.77" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydraulic control system** direct engine drive **Transmission** fixed ratio operator controlled partial range power shifting **Advertised speeds mph** first 1.48 second 2.26 third 3.58 fourth 4.79 fifth 6.54 reverse 2.12 (using torque amplifier) first 1.00 second 1.53 third 2.42 fourth 3.23 fifth 4.31 reverse 1.43 **Clutch** single plate dry disc operated by foot pedal **Brakes** contracting bands operated independently by two hand levers or by one foot pedal for both brakes **Steering** hand levers controlling multiple disc clutches and brakes **Turning space diameter** (with brake applied) right 153" left 153" **Belt pulley** 1270 rpm at 2000 engine rpm diam 9½" face 6⅜" **Belt speed** 3160 fpm **Power take-off** 980 rpm at 2000 engine rpm.

TOTAL WEIGHT with operator 6995 lbs including front end weights 375 lbs, crankcase guards 100 lbs.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 754.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ the 85% torque; maximum power; ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

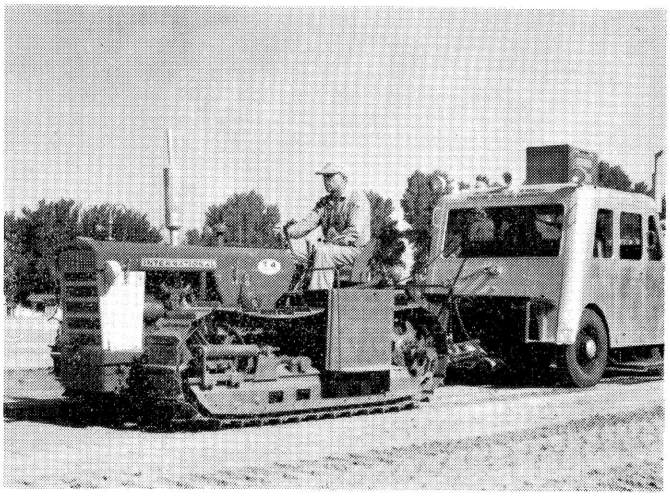
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions; (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**



International T-4 Gasoline